

VIII. *Further Notes on the Caprification of domestic Figs, with reference to Dr. Paul Mayer's comments thereon.* By Sir SIDNEY S. SAUNDERS, C.M.G.

[Read February 6th, 1884.]

IN my former remarks on Count zu Solms-Laubach's investigations at Naples, as set forth in his exhaustive Essay on "The origin, domestication, and culture of the common Fig-tree, *Ficus Carica*, L.," I observed that, as regards promoting the distension, maintenance, or maturity of the crop, by the so-called "Caprification-process," there was a lack of evidence which rendered it difficult to reconcile this traditional doctrine with any reputed virtues ascribed thereto in certain parts of Southern Europe and the Levant, though ignored in other regions; an operation, moreover, which Count Solms has himself denounced as supererogatory (jetzt kaum mehr nützliche), in modification, as he observes, of Olivier's formulary,\* characterizing this process as "un tribut que l'homme payait à l'ignorance et aux préjugés"; a verdict (Ausspruch) which, as the Count explains (pp. 24 and 26), Olivier's imperfect acquaintance with the practice did not justify.

Dr. Paul Mayer, Superintendent of the German Zoological Station at Naples, who assisted the Count in many of his researches, and himself the author of an elaborate treatise on "Fig-Insects," referred to with deserved encomium in our 'Transactions' on more than one occasion, has now favoured me with various interesting explanations to which he is desirous of calling attention; and in order to admit of full scope to his valuable expositions on these matters, I append hereto a copy of his communication, coupled with some subsidiary remarks. Nevertheless Dr. Mayer is labouring under some misconception in supposing that my commentary upon the Count's essay applied conjointly to the works

---

\* Sei dem jedoch wie es wolle, auf alle Fälle darf man dem oben p. 26 citirten Satze Oliviers mit Grund einen anderen substituieren der etwa wie folgt formulirt werden könnte (Solms, p. 44).

of both alike. On the contrary, his own treatise aforesaid was only casually alluded to as summarizing the Count's remarks on the abstruse topic of *impracticable oviposition*, for which no reasons had been suggested by either. There was, moreover, the less need of entering into a twofold controversy upon these matters, when both writers had been cooperating from first to last, and had worked out their results in harmony with each other; the Count's conclusions as to his appreciation of Caprification having been adopted verbatim by Dr. Mayer; as also the observations of the Count on anomalous oviposition (p. 560); so that in adhering to the recital of the latter there seemed to be no reason to anticipate any divergence therefrom on the part of his coadjutor, the homogeneous character of their intimate convictions being assumed as unquestionable; which indeed the tenor of Dr. Mayer's present communication amply serves to corroborate.

Passing now to the new facts elicited, Dr. Mayer commences by informing us that, in a certain passage of *his* treatise referring to opening a fig having the wings of the female *Blastophaga* adhering to the scales of the ostium (Eröffnet man also eine junge Feige, deren Aussenseite am Ostium die Flügel der Blastophaga ankleben—p. 559), he was speaking of a *domestic* fig (eine *zahme*), which he conceives is clear from the context. This was by no means evident—nor even presumable—when compared with the parallel passage in Count Solms' version—to which alone my remarks applied—where the latter unmistakably refers to a *wild* fig; for in his Chapter III. (p. 19), treating of the "Insects dwelling in the fruit of the *Caprificus*," he narrates how the disrupted wings of the females issuing from the *wild* winter-figs (*Mamme*), are found adhering to the ostium of the *wild* spring-figs (die jungen *Profichi*); on opening which (Eröffnet man nun die *Profichi*) he gives also a corresponding account to that supplied by Dr. Mayer of the proceedings of these wingless females in traversing the florets hither and thither for the purpose of oviposition; of their frequently perishing in endeavouring to find their way in or out of the "*Profico*"; of their corpses being often met with in the cavity; of Godeheu de Riville's remark on "ripe figs," &c.; all which appear in serial sequence in Dr. Mayer's version (p. 559); followed alike, in both instances, by the Count's *woodcut*

illustrating the *normal* process of oviposition ; no allusion being made in either case to any *anomaly* in this respect, as *subsequently* adverted to in the *domestic* figs ("Bei den essbaren Feigen verläuft der Vorgang anders"—Mayer, p. 560). Hence the presumption could only be that *both* were speaking of the *same* description of fig—namely, a *wild* one—left ambiguous in one version, but defined as such in the other ; the more especially when, in the presence of this specification by the Count, no explanatory character in a different sense was imparted by his colleague.

Secondly—Dr. Mayer, when speaking of the "edible" or "domestic" figs in several cited passages, adverts to the proceedings of the *Blastophagæ* on such occasions ; namely (1) to their futile attempts at oviposition in the first crop of *edible* figs—the so-called "Fiori di Fico"—in their young stage early in April (pp. 560 and 562) ; (2) to their conveyance of pollen, whereby fructification of the seeds ensues (p. 561) ; (3) to their ovipositing—also without progeny—in the *second* crop of *edible* figs, while these are still very small, at the time when these insects issue from the caprificating wild-figs (*Profichi*) in June and July, and when moreover they also invade the wild-figs of the *third* crop—the so-called "*Mammoni*" (p. 562) ; all which circumstances, in so far as referred to by the Count, were comprised by me under the category of "experimental essays," which—now authoritatively denied—offered the only apparent solution of problems involving the presence of these insects in such domestic figs. But the remarkable factor which has now to be taken into account—namely, that of their ingress on these occasions being the *normal result* of caprification—cannot but serve to intensify the mystery of their subsequent proceedings and disappearance therefrom. In a passage already adverted to, Count Solms informs us, as the result of his own investigations, that in the aforesaid "Fiori di Fico" these insects try to pierce a perpendicular channel from the florets above to the required depth below (as shown in his woodcut at p. 21) in order to deposit their ova, but cannot succeed in effecting this, the egg never attaining its proper place. This, Dr. Mayer now tells us "*presupposes* that they had entered the fig in the usual way—through the scales."

The Count proceeds to state that the creature seems to have soon perceived the inutility of its efforts and to

have retrograded. After usually attempting to pierce a very small number of florets, conscious of her mistake, she quits the fig by the ostiolum, between whose scales she frequently remains affixed and terminates her existence (häufig stecken bleibt und verendet); her egg being found in very different places according to circumstances; occasionally hanging loose, as described by Gasparrini; in other cases more or less tightly thrust down in the semi-pierced channel; sometimes even in a reversed position, with the pedicel in front stove in (Solms, pp. 36, 37).

Hence it would seem that in the *Caprificus* figs the female *Blastophagæ* usually continue depositing their ova until at length they die exhausted within the interior of the fig, where their bodies, in fact, are found (schliesslich gehen sie dann peractis peragendis zu Grunde, häufig erst beim Versuch den Ausweg aus der Profico wieder zu gewinnen—Solms, p. 21); whereas in the domestic figs, having become speedily aware of their error, they are earlier disposed to retreat, and thus effect their escape betimes, unless entrapped by the obstructing scales when quitting.

But the disqualification of these domestic figs for the reception of the ova has yet to be considered; for although partial desiccation may still influence the result of actual investigation, as already suggested, yet the absence of progeny under ordinary circumstances, after the ingress effected by these insects consequent upon caprification, would seem to indicate some anachronism in the respective stages of these figs, as compared with those of the *Caprificus* where no such obstacles are encountered. Thus, whereas the *first matured crop* of the latter (so-called "*Manne*") passes the winter on the trees and ripens early in April; the earliest domestic figs (the "*Fiori di Fico*") still in their infancy, whose trees had not incurred the depletion of a hibernating crop, would be more forward in their growth, and their internal organism presumably less accessible to the delicate function of oviposition, than the budding "*Profichi*"—or *second crop* of wild-figs—to which the *Blastophagæ* then emerging from the winter-figs are accustomed to resort for the development of their offspring. This relative retardation in the one case would operate to a corresponding extent upon the successive crop of wild-figs in June and July, when the females of

the caprificating brood, emanating from the aforesaid "*Profichi*," find the incipient "*Mammoni*," or *third* crop of wild-figs, more or less available for their reception, though some are still quite small and scarcely visible at that time (Mayer, p. 562); while the young *domestic*-figs of the forthcoming *second* crop are comparatively more advanced and their condition practically unfitted for effective oviposition, as already exemplified.

But the Count has taken considerable pains to ascertain the limits within which the dogma of caprification has prevailed; and, among the many writers cited, has been unable to find any allusion to such a practice in the heart of Asia; while from the evidence obtained in other quarters it results, that the middle and north of Italy, the Tyrol, Sardinia, Corsica, the south of France, the north of Spain, the north of Portugal, the Canaries, the Azores, and Egypt, are beyond the pale of these doctrines and ignore them altogether (Solms, pp. 60, 61).

That in these widely divergent regions ficiculture should be in nowise trammelled with such tactics would seem to discredit the notion of any benefit being conferred by this institution beyond fertilizing the seed-germs; which ingequence, as the Count pronounces in his formula, "once necessary," is now "scarcely useful," such seedlings, unless specially favoured—as in the instance cited by Cavolini of "*quel fico ora detto del vescovo che nacque in Sorento su di un muro di un pollajo di quel arcivescovo*"—being generally worthless, and the fig-tree at the present day being almost exclusively propagated by layers (fast ausschliesslich durch Marcotten vermehrt—Ib. p. 17).

The incongruous device prescribed as a remedy of equivalent efficacy in the absence of *Caprificus* figs, by substituting in their stead the leaf-galls of the elm (die Aphiden-Blattgallen den Ulm—Ib. p. 76) and other anomalous practices, can only serve as a mere salvo for conscience sake, though inculcated by Theophrastus and his disciples! So also when a single *Caprificus*-tree is planted in the fig-gardens as adequate protection for all the other fig-trees, the result "being left to chance" (Ib. p. 24); as if it were possible for *each fig*, or for the greater part of the crop, to be influenced thereby in the sense which the Neapolitans attribute to this precautionary measure, namely to prevent them from fall-



ing unripe, and to accelerate their maturity.\* Others, however, abstaining from traditional theories, have pinned their faith to those principles formulated of old and still maintained unimpaired at Rome, as set forth in the following precept by Cato "*de re rustica*"—reiterated by Varro—whereby both the aforesaid contingencies are provided for without having recourse to equivocal allies: "*Fici ut grossos teneant facito omnia quomodo oleæ et hoc amplius. Cum rer adpetit terram adaggerato bene. Si ita feceris et grossi non cadent et fici scabræ non fient et multo præcociores erunt*" (Solms, p. 86).

Thirdly—we are further informed by Dr. Mayer that, on entering the domestic figs as aforesaid, these insects bring pollen with them, if they should have been furnished therewith in creeping out of the wild-figs; for, notwithstanding their efforts to cleanse themselves therefrom as recited by the Count, some of it still remains, whereby fecundation is effected; no other influence being here ascribed to it. The amount thus retained, however small, must be still further reduced during the "arduous efforts" subsequently made to penetrate through the scales: but, in another passage to which Dr. Mayer adverts, the Count speaks of certain other domestic figs, highly esteemed, termed "*Pedagnuoli*"—† caprificated in summer by means of the "*Profichi*"—in whose florets he could generally discover neither perforation (Stichkanal) nor *Blastophagæ*, but only here and there some very small brown superficial specks (Punkte), which, as he states, must have proceeded from wounds inflicted by the insect, whose puncture had apparently become impracticable from some obscure cause requiring further investigation. Nevertheless, every such floret, which by its brown stains (Flecken) indicated insect-visitation, is encumbered with shifting masses of pollen (mit wech-

---

\* "Ueber den durch die Caprification zu erzielenden Erfolg, sind die Meinungen getheilt. Die neapolitanischen Bauern halten dafür, dass sie das Abfallen der unreifen Feigen verhindere und eine frühere Reife bedinge. Doch sind nach ihrer Meinung nicht alle Sorten derselben in gleichem Maasse bedürftig, wenschon sie niemals schaden kann" (Ib. p. 24). Gasparrini's adverse testimony, founded upon experiments as to the alleged maintenance and earlier ripening, has been already cited (Trans. Ent. Soc. Lond. 1883, p. 391).

† "Die ersten untersten Früchte, die '*pedagnuoli*' der Neapolitanischen Landleute, sind besser und geschätzter als die oberen, die sie '*cimaruoli*' nennen" (Solms, p. 8).

selnden Mengen von Pollen behaftet) that could only have reached the secluded female inflorescence from without. This causes such "*Pedagnuoli*" to produce fertile seed in great abundance, which, as a rule, cannot be expected in figs which no insect has fecundated (sich keines Insektenbesuches erfreuten—Solms, pp. 37, 38).

I may here observe also that the cleansing process habitually practised by the *Blastophaga* on issuing from the wild-fig, is no less applicable to the *Idarnella Caricæ* (nuper *Idarnodes* Westw., Trans. Ent. Soc. Lond., 1883, Errata, p. viii.), according to my Smyrna correspondent, who states:—"I have seen both *Chalcis* and *Blastophaga* clean themselves carefully as soon as they had emerged from their prison."

Fourthly—Dr. Mayer seems to think that, in adverting to Godeheu de Riville's assertion, and to the Count's remark thereon, I treated that passage as applicable to *wild-figs*; whereas the whole tenor of my argument in that paragraph served to show that, in so far as could be gathered from the Count's recital, there was apparently no corresponding evidence bearing upon *ripe domestic-figs*; and that neither the Count himself nor others—save as alleged by this one antiquated writer—had found any *Blastophagæ* in the latter (cited by Solms as "*in den reifen Feigen*"—p. 21), the *wild-figs* being their natural habitat.

Finally Dr. Mayer tells us the Count and himself had anticipated that, after the appearance of their works, entomologists would take an interest in this apparently hitherto neglected field—where, however, other pioneers had not been wanting to stimulate researches in this direction. He then laments over technical complications in synonymy, &c.; dwelling also on the supreme importance of anatomical investigations for the discrimination of sexual characters; whence we arrive at the gist of his argument, in the reflection which he conceives to have been cast upon himself, in being supposed to confound the male of Cavolini's *Ichneumon ficarius* with the subapterous female of *Sycoscapter insignis*; maintaining his accuracy, not only on anatomical grounds, but also as having witnessed the union of the former with its long-tailed winged partner, so that no mistake can exist thereon. He will however have been gratified to perceive, from Professor Westwood's subsequent memoir in our 'Transactions' (1883,

p. 375; Plate xvi., fig. 1, 1a-f), that, by a fortunate coincidence in the case of a nearly-allied Ceylonese species, no tardy rectification had been made, fully exonerating him from any such imputation long prior to his present remonstrance. I was indeed unfortunate enough to participate myself to a certain extent in this lamentable hallucination (Ibid. p. 16), without however having lapsed quite so far as to implicate the sex.

Stazione Zoologica, Napoli, 28 Dic, '83.

SEHR GEEHRTER HERR,

Indem ich Ihnen für die freundliche Uebersendung Ihrer neuesten Arbeit über Feigeninsekten bestens danke, möchte ich mir gestatten Sie auf einen Irrthum aufmerksam zu machen, den Sie mit Bezug auf Solms' und meine eigene Arbeit begangen haben. Sie sagen p. 390, es gehe aus unserer Darstellung nicht hervor, dass wir in den Blütenständen des zahmen Feigenbaumes *Blastophaga* ♀ gefunden hätten, und es sei daher sowohl in dieser Beziehung als auch betreffs der Uebertragung des Pollens "a lack of evidence" (p. 391 oben). Indessen ist das Gegentheil hiervon der Fall. So sage ich z. B. p. 559 Zeile 12: \* "Eröffnet man also eine junge Feige," &c., und dies ist, wie aus dem Vorhergehenden klar wird, eine zahme. Ferner sage ich p. 560 Zeile 5: † "bei den essbaren Feigen," &c. "Hier scheinen die Insekten den Einstich nur zu versuchen," &c. Ebenso p. 561 Zeile 6: ‡ "Was die Einwirkung des Insektenbesuches . . . und auf den zahmen Feigenbaum betrifft, so . . . dass sie die Bestäubung der weiblichen Blüten," &c. Ferner p. 562 Zeile 2: § "als auch in die erste Genera-

---

\* "Eröffnet man also eine junge Feige, deren aussenseite am Ostiolum die Flügel der *Blastophaga* ankleben," &c.

† "Bei den essbaren Feigen verläuft der Vorgang anders. Hier scheinen (Solms, p. 36 und 37) die Insekten entweder den Einstich nur zu versuchen," &c.

‡ "Was die Einwirkung des Insektenbesuches auf den *Caprificus* und auf den zahmen Feigenbaum betrifft, so habe ich oben schon kurz angedeutet (p. 553, Note), dass sie zunächst die Bestäubung der weiblichen Blüten und so die Erzeugung von Samen herbeiführt."

§ "Die ausgeschlüpften ♀ wandern nun sowohl in die zweite Generation des 'Profico,' die sogenannten 'Profichi' (welche in



tion der *essbaren* Feige," &c., und p. 562 Zeile 8:\* "die zweite Generation der *essbaren* Feigen." Und *Solms* sagt ausdrücklich p. 36 letzte Zeile: "In den Fiori di Fico stechen die Thiere in der That in den Griffel ein," was also doch voraussetzt, dass sie in das Innere des Blütenstaudes auf dem gewöhnlichen Wege (durch die Bracteen) eingedrungen sind. Sie legen dann das Ei ab, aber nicht in der richtigen Weise, und bringen Pollen mit, falls sie beim Auskriechen aus den Blütenständen des wilden Feigenbaumes sich mit ihm versehen konnten. Vergl. hierüber *Solms* p. 37 unten und 38 oben, wo sogar von Pollenschläuchen die Rede ist.

Wenn sie ferner p. 390 sagen, "which I did not succeed in doing," so bezieht sich die ganze Stelle der *Solms'schen* Abhandlung auf den *Caprificus* und nicht auf die essbare Feige, kann also nicht als Argument gegen uns angeführt werden. Es geht also aus dem Gesagten hervor, dass wir die Hypothese von der Bestäubung der *zahmen* Feige nicht gemacht haben "upon experimental essays made with figs laid open for the purpose of artificially introducing the Blastophagæ, which otherwise are not to be found therein" (*Saunders*, p. 391), sondern dass in der That *ganz normal* die Blastophaga in die zahme Feige eindringt, vorausgesetzt dass der Baum mit den Blütenständen des *Caprificus* behängt, also caprificirt ist. Und da das Insekt trotz seiner Bemühungen, sich vom Pollen zu reinigen, doch noch etwas davon mit sich führt, so bringt es auch die Bestäubung zu Wege.

Das nach dem Erscheinen unserer Arbeiten sich die Entomologen des bis dahin ziemlich vernachlässigten Arbeitsfeldes annehmen würden, haben wir vorausgesehen. Leider scheint aber die Verwirrung der Synonymie und Systematik einstweilen noch im Zunehmen begriffen zu sein, was ich im Interesse der Sache sehr bedauere. Ich finde es aber unrecht, wenn man bloß Beschreibungen neuer Arten mit zum Theil recht

---

Form und Grösse von den 'Mamme' sehr verschieden sind) als auch in die erste Generation der essbaren Feige, die sogenannten 'Fiori di Fico' ein, legen aber nur dort ihre Eier ab."

\* Diese, aus den 'Profichi' hervorgekommen, stechen eben sowohl die um jene Zeit noch sehr kleinen 'Fichi' d. h. die zweite Generation der essbaren Feigen—allerdings auch diese ohne Erfolg—als auch die dritte Generation der wilden Feigen, die sogenannten 'Mammoni' an."

ungenügenden Zeichnungen veröffentlicht, ohne sich um die Anatomie der Thiere zu kümmern, welche in so exceptionellen Fällen das einzige Mittel ist, um das Geschlecht der Thiere zu bestimmen. So z. B. Westwood (Trans. Ent. Soc. Lond. for 1883, p. 30) der mir vorwirft, ich habe ein "subapterous insect," das wol identisch mit *Sycoscapter insignis* ♀ sei, für das Männchen des "*Ichneumon ficarius*" gehalten. Natürlich habe ich das nur auf Grund anatomischer Untersuchung gethan, aber auch die Begattung beobachtet, sodass hierüber kein Zweifel sein kann. Prof. Mayr in Wien wird später wol viel Arbeit bekommen, um die inzwischen entstandenen falschen Synonymien wieder zu beseitigen, ist aber glücklicherweise der Mann für derartige schwierige Unternehmungen auf systematischem Gebiete.

Vielleicht finden Sie, geehrter Herr, bei einer späteren Publikation Gelegenheit, auf die oben berührten Punkte zurückzukommen und bei Ihren Landsleuten, die wohl mehr Ihre Kritik unserer Arbeiten, als die Originale lesen werden, das Misverständnis zu beseitigen. Inzwischen bin ich,

Ihr ganz ergebener

Dr. PAUL MAYER